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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,348	02/09/2004	Sandrine Cussat-Blanc	Q79477	6466

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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 08/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/773,348	CUSSAT-BLANC ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on June 14, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 1, 9 and 12 and has newly added claims 13-16.
- Claims 1-16 remain pending in this application.
- The objections to claims 8-10 set forth in the previous Office Action are *withdrawn* in response to applicant's amendment.

Claim Objections

1. **Claims 1-16 are objected to because of the following informalities:**

(1) Claims **1 and 12 have been amended** to include the phrase "reflected from a micromirror" that is confusing and indefinite since it is not clear what is the structural relationship between this micromirror and "a plurality of mirrors" recited in the earlier part of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-9 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Garrett et al in view of the patent issued to Chen et al (PN. 6,563,977) and patent application publication of Moon et al (US 2003/0174939).

Claims 1 and 12 have been amended and claims 13-16 have been newly added which therefore necessitate the new grounds of rejections.

Garrett et al teaches an *optical communication system* that is comprised of an *optical add-drop multiplexer (OADM)* for wavelength divisional *demultiplexing* and *multiplexing* optical signal wherein the ODAM comprises a *wavelength separating-routing* (WSR) *apparatus* for demultiplexing optical signal. The wavelength separating-routing apparatus comprises an *input port* (110-1, Figure 1A) serves as the *multiple channel* for inputting optical signal having a plurality of wavelength channels and a *plurality of separated output ports* (110-2 to 110-n, n>=3), serves as the *at least first and second separated channel ports*, a *diffraction grating* (101) serves as the *diffraction unit* disposed between the multiple channel port (110-1) and the separated channel ports (110-2 to 110-n) for separating and dispersing (or deflecting) different wavelength components or channels of the optical signal into different optical paths and the separated wavelength channels are directed by the diffraction grating to a *channel micromirror* (103) having a *plurality of mirrors* (please see Figure 1B) via a *focusing lens (102)*. The channel micromirror having a plurality of mirrors that are *individually angled* and controlled to receive and reflect different channel of the optical signal from the diffraction grating and back to the diffraction grating at different angles, (please see Figures 1A and 1B, column 6, line 61 to column 8, line 34).

Claims 1 and 12 have been amended to include the feature having "*a center wavelength of the optical signal is incident upon and reflected from a micromirror along substantially the same optical path*". **Garrett** et al does not teach such geometry explicitly however Garrett et al does teach that the channel micromirror (103) having a plurality of mirrors that are individually angled and controlled to redirect the different channel of the optical signal to desired optical paths. This suggests the capability of

directing the optical channels along optical paths as desired. **Chen** et al in the same field of endeavor teaches a wavelength multiplexer/demultiplexer having a geometry including the diffractive grating and mirror (Figure 1) that is so arranged that the center wavelength of the optical signal separated by the diffractive grating (16) is incident upon and reflected from the mirror (8) along essential the same optical path. **Moon** et al also in the same field of endeavor teaches a wavelength multiplexing arrangement having *micromirror device* (18, in a modulator device 16, Figures 1-10 or 130 Figures 19-24) having a plurality of micromirrors (20) that are individually controlled and angled such that the light beams from the diffractive grating (42) is incident upon and reflected back to the grating along the same optical path. It would then have been obvious to one skilled in the art to apply the teachings of **Chen** et al and **Moon** et al to rearrange the grating and channel micromirror of **Garrett** et al to have the *geometry* such that the center wavelength of the optical signal is incident upon and reflected back to the diffractive grating along the same optical path for the benefit of having different geometric design for the optical paths of the optical channels. Such modification really is just a matters of *geometric design* since Garret et al reference without this specific optical path route *has already achieved* the same multiplexing and demultiplexing purpose of the optical signal, as the instant applicant also claims. the specific optical path arrangement is just an obvious matter of design choice to one skilled in the art since it does not change the function of the demultiplexing and multiplexing of the device.

With regard to claims 2-3, Garrett et al teaches that the different channels of the optical signal from the diffraction grating are *focused* to the channel micromirror (103) via a *focusing lens* (102) and the focusing lens defines a *conjugate* plane with respect to the diffraction grating and the plurality of mirrors of the channel micromirror are disposed along the *conjugate plane*, (please see Figure 1A).

With regard to claims 4-5, Garrett et al teaches that the mirrors in the channel micromirror are *pivotable* or *deflectable* along X-axis, (please see Figures 1A and 1B) which means the mirrors can be

individually angled with respect to Y-axis which is a longitudinal axis of the diffraction grating. It is implicitly true that the diffraction grating can be rotated about the longitudinal axis.

With regard to claim 6, Garrett et al teaches that a plurality of *collimators* (110, Figure 1A) is used between the diffraction grating and the input port or multiple channel port (110-1) and output ports or separated channel ports (110-2 to 110-n).

With regard to claim 7, Garrett et al does not teach explicitly that the diffraction grating includes a spherical mirror to focus the optical beams. **Chen** et al in the same field of endeavor teaches an optical multiplexing and demultiplexing device wherein the diffraction grating (122, Figure 9) is designed to include a spherical mirror to also focus the diffracted light beams from the diffraction grating to the mirror (126, column 16, lines 16-34). It would then have been obvious to one skilled in the art to apply the teachings of **Chen** et al to modify the device of **Garrett** et al to make the diffraction grating also have a spherical mirror function so that the diffraction grating can provide both the dispersing and focusing functions to the optical signal for the benefit of eliminating the use of an additional focusing lens to make the device more compact in size.

With regard to claims 8 and 9 and newly added claims 13-16, **Garrett** et al teaches the wavelength separating routing apparatus is used in an *add-drop multiplexer communication system* wherein optical transmitter and optical receiver for transmitting and receiving the optical signal are implicitly included. **Garrett** et al also teaches that separated optical ports (110-2 to 110-n) can be arranged to receive a plurality of *output demultiplexed* channels from the input multiplex channel which implies that the device may also be used in wavelength divisional communication system using demultiplexed output wavelength channels. **Chen** in the same field of endeavor also teaches that demultiplexed wavelength channels may be output to make the device a demultiplexer useable in a demultiplexed optical communication system.

With regard to claim 12, the method for demultiplexing the optical signal utilizing the diffraction grating and the channel micromirror is included in the device description above.

4. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Garrett et al, Chen et al and Patent application publication by Moon et al as applied to claim 1 above and further in view of the patent issued to Chang et al (PN. 5,392,154).

The wavelength separating routing apparatus used to demultiplex optical signal taught by **Garrett** et al in combination of the teachings of **Chen et al and Moon et al** as described for claim 1 above have met all the limitations of the claim.

Garrett et al teaches it is important to dynamically manage the optical power levels and then to achieve power equalization at each stage of the optical communication system, (please see column 3, lines 21-37). Garrett et al also teaches that a *servo-control assembly* (440, Figure 4A) can be provided to manage the power level of the output ports at channel-by-channel basis to achieve desired power equalization, (please see column 11, lines 45-55). This reference however does not teaches explicitly to use a first and second amplifier stage parallel to each other such that each amplifier is adapted to amplify the optical signal in a different wavelength band. **Chang** et al in the same field of endeavor teaches a self-regulating multiwavelength optical amplifier module for an optical communication system wherein a plurality of amplifiers (208-1 to 208-4, Figure 2) arranged in a parallel fashion are used to amplify therefore regulate and equalize power of the optical signals from the demultiplexer in a channel-by-channel basis, (please see columns 5, lines 48-69). Each of the parallel-arranged amplifiers is placed in an optical path of a demultiplexed signal form the demultiplexer and to amplify the signal based on a specific wavelength band. It would have been obvious to one skilled in the art to apply the teachings of Chang et al to use a plurality of amplifiers each at a different channel in the servo-control assembly of

Garrett et al to amplify the optical signal in a channel-by-channel basis for the benefit of achieving the desired optical equalization of the output channels and reduce inter-channel cross-saturation problems.

Response to Arguments

5. Applicant's arguments with respect to **amended** claims 1-12 and **newly added** claims 13-16 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicants' arguments are mainly based on the newly amended features and the newly added claims and they have been fully addressed in the paragraphs above.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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